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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/819,670	03/29/2001	Seiji Takeuchi	862.C2168	3161

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EXAMINER
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KOSOWSKI, ALEXANDER J

ART UNIT	PAPER NUMBER
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2125

DATE MAILED: 10/29/2003

14

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/819,670

Applicant(s)

TAKEUCHI ET AL.

Examiner

Alexander J Kosowski

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 September 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 42-53 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 42-53 is/are rejected.
- 7) ☒ Claim(s) 52 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All   b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other:  |

### DETAILED ACTION

- 1) Claims 42-53 are presented for examination. Claims 1-41 have been canceled.

#### *Claim Objections*

- 2) Claim 52 is objected to.

Referring to claim 52, the phrase "using F2 excimer laser" should read --using an F2 excimer laser--.

#### *Claim Rejections - 35 USC § 112*

- 3) The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- 4) Claims 49, 52 and 53 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Referring to claims 49 and 53, it is unclear whether the claims are directed toward a method or a system. Both independent claims on which claims 49 and 53 depend on are clearly directed toward a system, however claims 49 and 53 effectively alter the preamble of their respective independent claims by claiming a method.

Referring to claim 52, the claim recites the limitation "the reticle" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Referring to claim 53, the claim recites the limitation "the reticle" in line 5. There is insufficient antecedent basis for this limitation in the claim.

Referring to claim 53, the claim recites the limitation "the wafer" in line 4. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

5) The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6) Claims 42-45 and 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable by Iwabuchi et al (U.S. Pat 5,407,350), further in view of Suenaga et al (U.S. Pat 6,451,507).

Referring to claim 42, Iwabuchi teaches a wafer processing system comprising a wafer treatment apparatus (col. 3 lines 3-7) for treating a wafer in a first atmosphere (col. 4 lines 45-56), a stocker (col. 3 lines 9-12) having a sealing member and an atmosphere controller for controlling an interior of the sealing member to a second atmosphere, for stocking a wafer in the second atmosphere (col. 9 lines 9-27 and col. 11 lines 38-67), a transfer path for transferring wafers from the stocker to the treatment apparatus and for transferring the wafers from the treatment apparatus to the stocker (col. 3 lines 3-12 and Figure 1), and a load-lock chamber for transferring wafers to the stocker, after the wafer is received from an exterior of said treatment apparatus and an atmosphere replacement is performed to change an exterior atmosphere to the second atmosphere (col. 6 lines 4-16 and col. 11 lines 37-67). However, Iwabuchi does not explicitly teach that the treatment apparatus is an exposure apparatus for exposing a wafer to a pattern on a reticle, nor that a reticle is transferred and stocked in the system.

Suenaga teaches an exposure apparatus for exposing a wafer to a pattern on a reticle (Abstract, lines 4-6), whereby a reticle is transferred to and from the exposure apparatus and stored in a reticle stocker (col. 18 lines 31-38).

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Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize reticles and to expose wafers to reticle patterns in the system taught by Iwabuchi since both reticles and wafers need to be kept as clean as possible during transfers between stockers and treatment apparatuses (Suegna, col. 18 lines 31-34, whereby it is taught that atmosphere replacements are necessary to prevent contamination) and since it is noted that both exposure apparatuses and heat treatment apparatuses are necessary for the fabrication of semiconductor wafers.

Referring to claim 43, Iwabuchi teaches that the same load-lock chamber used to transfer items to the stocker may be used to transfer items to the treatment apparatus, and that an atmosphere replacement is performed to change the second atmosphere to the first atmosphere (col. 6 lines 4-16 and col. 11 lines 37-67 and Figure 2). However, Iwabuchi does not explicitly teach that the treatment apparatus is an exposure apparatus for exposing a wafer to a pattern on a reticle, nor that a reticle is transferred and stocked in the system.

Suenaga teaches an exposure apparatus for exposing a wafer to a pattern on a reticle (Abstract, lines 4-6), whereby a reticle is transferred to and from the exposure apparatus and stored in a reticle stocker (col. 18 lines 31-38).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize reticles in the system taught by Iwabuchi since both reticles and wafers need to be kept as clean as possible during transfers between stockers and treatment apparatuses (Suegna, col. 18 lines 31-34, whereby it is taught that atmosphere replacements are necessary to prevent contamination) and since it is noted that both exposure apparatuses and heat treatment apparatuses are necessary for the fabrication of semiconductor wafers.

Referring to claim 44, Iwabuchi teaches the system above. However, Iwabuchi does not explicitly teach an exposure apparatus that transfers a pattern on a reticle to a wafer using an F2 excimer laser, nor that an oxygen concentration of said first atmosphere is equal to or less than 1 ppm and an oxygen concentration of said second atmosphere is equal to or less than 50 ppm.

Suenega teaches an exposure apparatus that transfers a pattern on a reticle to a wafer (Abstract, lines 4-6), whereby an F2 excimer laser may be used (col. 17 lines 13-15).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize an exposure apparatus with an F2 excimer laser in the system taught by Iwabuchi since an F2 laser improves the resolving power of a projection optical system, allowing for finer patterns in semiconductor integrated circuits (Suenega, col. 1 lines 12-47). In addition, it would have been obvious to have the oxygen concentration of the first atmosphere less than 1 ppm since Suenega teaches that it is necessary to reduce oxygen as much as possible since oxygen is known to absorb F2 laser wavelengths (Suenega, col. 1 lines 12-47). It is also noted that it would have been obvious to keep oxygen concentration of the second atmosphere below 50 ppm since this is necessary to minimize contamination of the sealed chamber.

Referring to claim 45, Iwabuchi teaches that the atmosphere controller has evacuation means and inert gas injection means, and repeats alternatively an evacuation by said evacuation means and an inert gas injection by said inert gas injection means (col. 11 line 37 through col. 12 line 2).

Referring to claim 47, Iwabuchi teaches that wafers are stored in a box (col. 9 lines 9-24), that said load-lock chamber performs atmosphere replacement to control an external atmosphere of said processing system to the second atmosphere while the box is open, after the wafer stored

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in the box is received from an exterior of the processing system, and wherein the transfer path transfers the wafer in the box from the stocker to the treatment apparatus while the box is closed (col. 9 lines 9-68, whereby the wafers are stored in cassettes which are closed during transport but are opened to retrieve the wafers). However, Iwabuchi does not explicitly teach that reticles are stored in the box and transferred.

Suenaga teaches an exposure apparatus for exposing a wafer to a pattern on a reticle (Abstract, lines 4-6), whereby a reticle is transferred to and from the exposure apparatus and stored in a reticle stocker (col. 18 lines 31-38).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize and transfer reticles and to store them in a box in the system taught by Iwabuchi since both reticles and wafers need to be kept as clean as possible during transfers between stockers and treatment apparatuses (Suegnaga, col. 18 lines 31-34, whereby it is taught that atmosphere replacements are necessary to prevent contamination).

Referring to claim 48, Iwabuchi teaches that the stocker stocks wafers stored in a box in said second atmosphere while said box is opened and that said transfer path transfers the wafers in the box from said stocker to said treatment apparatus while the box is closed (col. 9 lines 9-68, whereby the wafers are stored in cassettes which are closed during transport but are opened to retrieve the wafers). However, Iwabuchi does not explicitly teach that reticles are stored in the box and transferred.

Suenaga teaches an exposure apparatus for exposing a wafer to a pattern on a reticle (Abstract, lines 4-6), whereby a reticle is transferred to and from the exposure apparatus and stored in a reticle stocker (col. 18 lines 31-38).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize and transfer reticles and to store them in a box in the system taught by Iwabuchi since both reticles and wafers need to be kept as clean as possible during transfers between stockers and treatment apparatuses (Suegna, col. 18 lines 31-34, whereby it is taught that atmosphere replacements are necessary to prevent contamination).

Referring to claim 49, one would inherently use the system taught by Iwabuchi and Suenaga above to perform an exposure process and develop a wafer.

7) Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwabuchi and Suenga as disclosed above, further in view of Iwasaki (U.S. Pat 6,134,482).

Referring to claim 46, Iwabuchi and Suenga disclose the system above. However, they do not explicitly teach confirmation means for confirming whether the reticle has been stocked in the stocker for a predetermined time, when the reticle is transferred from said stocker to said exposure apparatus.

Iwasaki teaches a wafer processing system whereby reticles are transferred from the stocker only when pre-determined times have been achieved (col. 8 line 46 through col. 9 line 45).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to confirm whether the reticle has been stocked in the stocker for a predetermined time in the invention taught by Iwabuchi and Suenaga since this allows the system to check for in-process cassettes which might interfere with the stocking function (Iwasaki, col. 8 lines 46-62).

8) Claims 50-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suenaga, further in view of Iwai (U.S. Pat 5,829,939).



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Referring to claim 50, Suenega teaches a stocker for stocking substrates whereby atmosphere controllers are used to control the atmospheres that the wafers are transported through and processed within (col. 18 lines 5-38), whereby a sealing member for storing the substrates is controlled to a second atmosphere (col. 19 lines 12-39). However, Suenega does not explicitly teach that the substrates are covered with a substrate cover, nor that an atmosphere controller controls an atmosphere of the interior of the sealing member to a first atmosphere simultaneously to controlling the second atmosphere.

Iwai teaches a processing system whereby substrates which are covered with substrate covers are transported in and out of treatment apparatuses and whereby the interior of said substrate cover is controlled to a first atmosphere (col. 11 line 58 through col. 12 line 20).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize a substrate cover to cover the substrates and to control the interior of the substrate cover to a second atmosphere in the invention taught by Suenega since this would allow the cassette carrying the wafers to be filled with clean air at a very high cleanliness level to create a non-oxygen atmosphere (Iwai, col. 11 lines 64-67) which would allow the cassette containing the wafers to be conveyed through a working region which may be a lower cleanliness level (Iwai, col. 12 lines 2-5). In addition, it would have been obvious to simultaneously control the first and second atmospheres since it is noted that this would allow both atmospheres to comprise air of identical cleanliness.

Referring to claim 51, Suenega teaches an exposure apparatus for performing an exposure process for a substrate in a first atmosphere (Abstract, lines 1-10 and col. 18 lines 5-25), a substrate stocker having a sealing member for storing said substrate and having a controller for

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controlling the atmosphere of the sealing member to a third atmosphere (col. 18 line 46 through col. 19 line 6), and a transfer path for transferring the substrate between said exposure apparatus and said substrate stocker (col. 18 lines 35-38). However, Suenega does not explicitly teach that the substrate is covered with a substrate cover, nor an atmosphere controller for controlling an interior of said substrate cover to a second atmosphere.

Iwai teaches a processing system whereby substrates which are covered with substrate covers are transported in and out of treatment apparatuses and whereby the interior of said substrate cover is controlled to a second atmosphere (col. 11 line 58 through col. 12 line 20).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize a substrate cover to cover the substrates and to control the interior of the substrate cover to a second atmosphere in the invention taught by Suenega since this would allow the cassette carrying the wafers to be filled with clean air at a very high cleanliness level to create a non-oxygen atmosphere (Iwai, col. 11 lines 64-67) which would allow the cassette containing the wafers to be conveyed through a working region which may be a lower cleanliness level (Iwai, col. 12 lines 2-5).

Referring to claim 52, Suenega teaches an exposure apparatus that transfers a pattern on a reticle to a wafer (Abstract, lines 4-6), whereby an F2 excimer laser may be used (col. 17 lines 13-15). However, Suenega does not explicitly teach that an oxygen concentration of the first atmosphere is equal to or less than 1 ppm, an oxygen concentration of the second atmosphere is equal to or less than 5 ppm and an oxygen concentration of said third atmosphere is equal to or less than 50 ppm.

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However, it is noted that it would have been obvious to have the oxygen concentration of the first atmosphere less than 1 ppm since Suenega teaches that it is necessary to reduce oxygen as much as possible since oxygen is known to absorb F2 laser wavelengths (Suenega, col. 1 lines 12-47). It is also noted that it would have been obvious to keep oxygen concentration of the second atmosphere below 5 ppm and the third atmosphere below 50 ppm since this is necessary to minimize contamination of the sealed chambers.

Referring to claim 53, one would inherently use the system taught by Suenaga and Iwai above to perform an exposure process and develop a wafer.

*Conclusion*

9) Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander J Kosowski whose telephone number is 703-305-3958. The examiner can normally be reached on Monday through Friday, alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached on 703-308-0538. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. In addition, the examiner's RightFAX number is 703-746-8370.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Alexander J. Kosowski  
Patent Examiner  
Art Unit 2125



LEO PICARD  
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